REPORT OF THE FEDERAL HORTICULTURAL BOARD.

UNITED STATES DEPARTMENT OF AGRICULTURE,
FEDERAL HORTICULTURAL BOARD,
Washington, D. C., September 30, 1918.

SIR: I submit herewith an executive report covering the administration of the plant quarantine act for the fiscal year ending June 30, 1918.

Respectfully,

C. L. MARLATT,
Chairman of Board.

Hon. D. F. HOUSTON,
Secretary of Agriculture.

LINES OF WORK.

The principal lines of work under the plant quarantine act during the fiscal year ending June 30, 1918, are as follows: (1) The pink bollworm work, including the cotton-free zone and quarantine work in Texas, the border quarantine and disinfection service as to cars and freight from Mexico, and the research work in relation to the life history and habits and means of control of the pink bollworm conducted in cooperation with Mexico near San Pedro in the Laguna district, Mexico; (2) the regulation of the entry of foreign cotton lint, waste, cotton bagging, etc.; (3) the regulation of the entry of nursery stock and other plants and plant products for propagation; and (4) the enforcement of the miscellaneous foreign and domestic quarantine and other restrictive orders listed at the end of this report.

The personnel of the board and its principal administrative officers remain the same as last year. Owing to war conditions the board has lost many of its efficient inspectors in both local and field service. The pink bollworm work in Texas and on the border has necessitated a very extensive addition to the quarantine inspection force. Port inspection offices are maintained at Boston, New York, Newark, San Francisco, Seattle, Calexico, and all of the border ports between Mexico and Texas. The occasional needs of other border ports and of the interior ports of entry are met for the most part by State officials acting as collaborators of the board. The board has continued its cooperative relations with the State, Treasury, and Post Office Departments of the Federal Government, and with State inspection and other officials. Many of the last have been appointed collaborators of the board.

Some of the more important activities of the board are discussed in the following pages.

THE PINK BOLLWORM.

REVIEW OF WORK IN TEXAS.

The establishment in the Laguna, the principal cotton-growing district of Mexico, of a very serious enemy of cotton, the pink bollworm, an insect before unknown on the North American continent, was discussed in the report of the Federal Horticultural Board last year. There was also noted the establishment of a quarantine immediately following this discovery, in November, 1916, prohibiting the further entry of cotton or cotton seed from Mexico, and the provision for a very complete border-control service to prevent the accidental entry of such products with freight cars or other cars, or freight or baggage, entering the United States from Mexico. A special appropriation of $50,000 by Congress made possible the institution of thoroughgoing inspection and clean-up operations with respect to the mills in Texas, which had, prior to the discovery of this insect in Mexico, received Mexican cotton seed for crushing. To secure information as to the distribution of the pink bollworm in the Laguna district and elsewhere in Mexico, as complete a survey as was possible, under the disturbed conditions obtaining in Mexico at that time, was made by experts of this department.

As reported in a footnote added to the report for last year three outbreaks of the pink bollworm were determined in Texas subsequent to the period covered in that report. Two of these undoubtedly originated from the seed received from Mexico during 1916, viz., at Hearne, reported September 12, and at Beaumont, reported October 15. The third area of infestation, reported October 21, is of uncertain origin and proved to be of much greater importance than the earlier ones, and involved a very considerable area surrounding Trinity Bay, Tex.

The clean-up operations which were instituted immediately on the discovery of each of these several points of infestation were of the most radical character and were made possible by a further emergency appropriation by Congress of $250,000, available October 6, 1917.

With respect to these several points of infestation the one at Hearne, Tex., was very trivial and involved only a few fields of cotton in the immediate neighborhood of the oil mill at that point which had received seed from Mexico in 1916. Only a few injured bolls were found and there is every reason to believe that the infestation at this point was entirely eliminated by the destruction of all growing cotton and the clean-up of the cotton fields which was carried out over a wide radius about the mill in question—a clean-up which involved the uprooting and burning of the standing cotton, the careful collection and burning of all scattered bolls and parts of plants, the prompt milling and destruction of the seed, and the shipment to Europe of the harvested lint.

The infestation in the neighborhood of Beaumont was aggravated by the fact that the mill in this instance violated its contract in relation to seed imported prior to the quarantine of 1916; namely, to use such seed for milling only and under a strict prohibition of sale

for planting. It developed that this mill sold Mexican cotton seed to a good many planters within a range of 20 or 30 miles of the mill, with the result of infesting a large number of cotton fields. These sales were all traced and the entire surrounding district was included in the clean-up operations and subsequent State quarantine.

The infestation about Trinity Bay, Tex., developed into an alarming situation, involving upward of 6,000 acres of cotton more or less surrounding this bay. The source of the infestation about Trinity Bay has not been definitely determined, but seems to have had no relation to any importation of cotton seed from Mexico prior to the establishment of the quarantine. The infestation in this district indicates the probable presence there of the insect for three or four years. The insect may have been introduced through some importation of foreign cotton seed in violation of the Federal quarantine, or, as seems more probable, through some storm-wrecked cotton or cotton seed from Mexico. Following the great storm of 1915 cotton lint and cotton seed were observed quite generally washed up about the shores of this bay, some of which was known to be from the Laguna, Mexico. The distribution of the insect about the bay indicated in the survey of the fall and winter of 1917 bears out this theory of origin.

A large force of experts and laborers was assembled and all the infested fields about Beaumont and Trinity Bay were subjected to the same radical clean-up previously carried out at Hearne, Tex. The officials of the State Department of Agriculture of Texas cooperated heartily, to the extent of available funds, in this survey and clean-up work. A total of 8,794 acres of cotton land in the Trinity Bay and Beaumont districts was thus cleaned of standing and scattered cotton at an average cost of $9.94 per acre. At the beginning the cost of the work was rather high, but as it progressed and the men in charge became more familiar with it, the cost per acre was considerably reduced. This cost does not include the technical supervision but merely the labor engaged in the actual clean-up, and the transportation and subsistence of this labor where such was necessary. In some cases field camps were established and maintained. The wages paid ranged from $1 to $2.50 per day, the majority of the men receiving $2 per day.

An effort also was made, which was substantially successful, to collect and mill under supervision all cotton seed grown in this section, and to ship the lint cotton to foreign countries via Galveston.

Prior to the discovery of the actual presence of the pink bollworm in Texas it seemed important, to protect the United States from the risk of entry of this insect by natural migration from Mexico, that the State of Texas should enact legislation giving authority to establish a zone free from cotton culture on the border of Texas adjacent to Mexico. A conference in Washington participated in by the commissioner of agriculture of Texas and other officials, including Representatives in Congress from that State, was therefore called under the auspices of the United States Department of Agriculture in July, 1917. This conference resulted in the passage of a law by the State of Texas (Oct. 3, 1917) providing for the establishment of cotton-free zones and giving quarantine and other powers of control

in relation to any districts in Texas infested with the pink bollworm. This act, which calls for Federal cooperation, became effective 90 days after the adjournment of the State legislature. Under it the following action has been taken by proclamation of the Governor of Texas:

(1) A pink bollworm quarantine was instituted January 21, 1918, placing under quarantine as to the cotton crop the two infested areas in Texas and providing for the clean-up of the infested fields and the disposition of the crop in such a manner as to afford adequate protection to the cotton industry of Texas. These quarantined zones are (No. 1) an area 6 miles in diameter surrounding the oil mill at Hearne, Tex., and (No. 2) the Trinity Bay and Beaumont districts, including the counties of Chambers, Jefferson, Galveston (except the island of Galveston), and portions of Brazoria, Fort Bend, Harris, Liberty, and Hardin counties. To this district was afterward added a small section, including Arcola as a center, extending to the Brazos River, by a proclamation of February 25, 1918. This extension was based on the finding of a single specimen in a field near Arcola. Inasmuch as this is merely a completion of quarantine district No. 2, the whole Trinity Bay region is referred to in this report as district No. 2.

(2) A border noncotton zone to include the counties of Kinney, Maverick, and Valverde was established February 18, 1918. This action was based on the determination of infestation of cotton lands in Mexico nearly opposite Eagle Pass, within 25 miles of the Texas border. The growth or transportation of cotton or any cotton product from said counties is forbidden for three years.

(3) A proclamation of noncotton zones was issued February 25, 1918, prohibiting after that date the growth of cotton in the districts above described for a term of three years, or so long as the pink bollworm menace to the cotton industry of Texas should exist.

This action has entailed a certain amount of loss and hardship to many planters within the quarantined and proclaimed cotton-free areas, in that it has eliminated what has been the principal money-producing crop. Fortunately in the principal district involved, the Trinity Bay region, cotton has not hitherto been the principal crop of the district, although one of large importance, especially in favorable years.

Some opposition developed to the quarantine and to the establishment of noncotton areas, but it is gratifying to report that the majority of the planters realized the need and the national aspect of the emergency and gave their full and hearty cooperation to the law. Complete cooperation was had in noncotton zone No. 1, involving the Hearne district, and in the border zone.

A very small percentage of the planters included in the quarantined district about Trinity Bay and Beaumont (noncotton zone No. 2), misled by a few interested parties, were induced to plant cotton in violation of the quarantine. About one-half of the cotton thus planted was, however, afterwards plowed out. Fully 95 per cent of the planters in this zone complied with the proclamation of the governor prohibiting the growth of cotton and cooperated fully in the subsequent clean-up operations with respect to volunteer cotton maintained in this district during the summer of 1918.

The extent of this cooperation is indicated by the fact that probably 50,000 acres of cotton would normally have been planted in

zone No. 2, whereas the cotton which was permitted to come to maturity in this district amounted to only 1,789 acres, involving the plantings of 137 individuals. Legal action has been taken by the State of Texas with respect to this unlawfully planted cotton, but, although the law has been sustained, the delay has been such that the crop from this planting has now been matured and is being harvested. This has produced a condition in which the State is faced with the necessity of safeguarding a crop of approximately 800 bales of cotton illegally grown. Rather than enforce the destruction of this cotton, it seemed desirable to effect a compromise, which would leave it available for use and yet so safeguarded in its harvesting and disposition as to reduce the risk probably as much as would its actual destruction at this time. A willingness on the part of the planters concerned to enter into such an arrangement has developed, and the compromised plan is now being put into effect. This compromise involves complete control by the State of the crop produced, and its harvesting and clean-up under the same radical methods followed with last year's crop. It further involves the assumption by the planters of the total cost of the necessary clean-up and their entering into an agreement not to plant or grow cotton in violation of any quarantine on account of the pink bollworm in the State for the term of such quarantine. This department has cooperated in securing this action and will aid in the carrying out of these provisions.

Throughout the summer all of the quarantined districts in Texas have been under inspection, and all volunteer or seedling cotton has been destroyed. The only growing cotton left is in the illegally planted fields in zone No. 2. Fortunately these fields are in parts of the quarantined area which were very sparsely or not at all infested last year, and the clean-up of old cotton and the destruction of the larvæ hibernating in old bolls in these districts, as elsewhere throughout the quarantined areas, was so thoroughly done during the fall and winter of 1917–18 that the likelihood of infestation this year has been reduced to a minimum.

The most encouraging feature of the year's work is the fact that not a single pink bollworm egg, larva, or moth has been found within either of the quarantined areas during the season of 1918, or elsewhere in Texas. This would seem to indicate the efficiency of the clean-up of last year of these districts, and gives very large ground of expectation for the ultimate complete extermination of the pink bollworm in Texas. If this result is achieved it will be the largest successful entomological experiment of the kind in history.

Field surveys are being conducted adjacent to the quarantined districts to determine any possible spread beyond the existing quarantine lines. Similar surveys are being continued also with respect to all the mills in Texas, which, prior to the discovery of the pink bollworm in Mexico, had received cotton seed from that country. Furthermore, all cotton seed and lint which had been imported from Mexico during 1915–16 has been traced to ultimate destination, and in all southern districts where such material has gone an inspection of adjacent cotton fields has been made. No infestations by the pink bollworm, other than those already determined in Texas, have been found anywhere in the United States as a result of these investigations.

The only adverse feature, therefore, is the cotton unlawfully planted in zone No. 2 in Texas. Responsibility for possible failure to exterminate the pink bollworm in Texas, should such failure ultimately result, must rest upon the comparatively few interested parties who have been responsible for misleading a number of farmers and encouraging them thus to violate the Texas statute. The individuals who have thus planted cotton in violation of the law are known, as also the acreage planted and the probable amount of the crop produced, and, under the State law, they must bear the expense of cleaning and disinfecting the cotton in such manner as the commissioner of agriculture of the State shall direct.

TEXAS BORDER QUARANTINE SERVICE.

The regulation of the entry into the United States of railway cars and other vehicles, freight, express, baggage, and other materials from Mexico and the inspection, cleaning, and disinfection of such cars and freight, etc., have been continued during the year to prevent the accidental movement of cotton and cottonseed from Mexico into the United States. This inspection service covers the ports of El Paso, Del Rio, Eagle Pass, Laredo, and Brownsville, and now involves the services of 11 inspectors. During the year 25,257 cars have been inspected and passed for entrance into the United States, divided among the border ports as follows: Brownsville, 1,635; Eagle Pass, 3,836; El Paso, 6,787; Laredo, 12,999.

No cars or freight fouled with cotton seed are permitted entry until such seed has been entirely removed. This necessitates, in many cases, the transfer of freight to clean cars on the Mexican side. In addition, as a condition of entry, all cars and freight which come to the border containing such seed are disinfected with hydrocyanic-acid gas. At the beginning of this work this disinfection was only given to cars or freight which had either been found to contain cotton seed or which had originated in regions where the pink bollworm was known to be present. The general presence of cotton seed in cars and freight later necessitated the fumigation of practically all cars and freight entering from Mexico, with the exception of certain cars concerned in the shipment of ore and lumber chiefly offered for entry at the port of El Paso, and which, under arrangement with the importing companies, were thoroughly cleaned of cotton seed at point of origin before loading and so certified.

The system of disinfection of cars and freight with hydrocyanic-acid gas by means of generators placed within the cars has been the best available means, but is unsatisfactory owing to the poor condition of the cars and also to the fact that it gave no security against any insects which might be resting on the exterior of the cars or their motive parts. To meet these defects it seemed highly desirable to provide for the disinfection of cars and freight in specially constructed houses capable of containing one or more cars at a time.

The erection of such fumigation houses was authorized toward the end of the fiscal year 1917–18, and plans were drawn, bids secured, and contracts let for the construction of five fumigation houses at the ports above mentioned. The construction of these houses is now well under way. Their size has been adjusted to the needs of the

traffic, and they have the following car capacity at the different ports of entry: Laredo, 15 cars; Eagle Pass, 8 cars; Brownsville, 6 cars; and El Paso, 1 car. At Del Rio no railroad line crosses the border, and a house is being constructed to take care of traffic in wagons and motor trucks. Each of these houses is provided with a system of generators in which hydrocyanic-acid gas is produced and distributed to the house.

The cost of this disinfection will be assumed by the Department of Agriculture and a charge will be made to cover the actual labor, other than supervision, and the chemicals used. The moneys so received, under the law, must be turned into the Treasury of the United States. This will result in a very considerable depletion of the funds available for this border quarantine service, and it will, therefore, probably be necessary to ask Congress to reimburse the fund thus expended. These houses will probably be completed and in use by the end of October, 1918, and will add very much to the efficiency of the border quarantine service.

THE SITUATION IN MEXICO.

The pink bollworm situation in Mexico, as determined by surveys conducted during the last two years, seems to confirm the limitation of the pink bollworm infestation to the Laguna district and to two other isolated areas of small extent opposite Eagle Pass, Tex. This situation indicates a much more favorable outlook for possible future extermination of the insect in Mexico than had been anticipated. The Mexican Government issued a decree on November 15, 1917, restricting transportation from the Laguna district of cotton or cotton seed to other parts of Mexico, and preliminary arrangements have been made in cooperation with the Mexican Government and the planters concerned, which may ultimately lead to the prohibition of the growth of cotton in the Laguna and in the other infested districts for a series of years and the substitution therefor of other crops.

The experiment station to study the pink bollworm and to conduct field experiments with the growth of crops in substitution for cotton established last year in the Laguna district by this department has enabled us to secure much needed information relating to the habits and food plants of the insect. This information may be of great future service in determining the most efficient means of preventing spread and maintaining field control. As to substitute crops, the wheat and corn crops of the Laguna this year have been extraordinarily successful, and the peanut and castor bean crops have given good promise.

PROVISIONS FOR PINK BOLLWORM WORK FOR THE FISCAL YEAR 1919.

To provide for the continuation of the pink bollworm work, the Secretary of Agriculture submitted to Congress an estimate for a special appropriation of $800,000, to be included in the Agricultural appropriation bill for the fiscal year 1919.[1] The House and Senate ultimately approved an appropriation for this purpose of $500,000. The items of work provided for under this appropriation are as follows:

(1) To prevent the movement of cotton and cotton seed from Mexico into the United States, including the regulation of the entry into the United States of

[1] Approved October 1, 1918.

railway cars and other vehicles, and freight, express, baggage, or other materials from Mexico, and the inspection, cleaning, an ddisinfection thereof, $50,000.

(2) To make surveys to determine the actual distribution of the pink bollworm in Mexico and to exterminate local infestations in Mexico near the border of the United States, in cooperation with the Mexican Government or local Mexican authorities, $25,000.

(3) To investigate in Mexico or elsewhere the pink bollworm as a basis for control measures, $25,000.

(4) To conduct surveys and inspections in Texas or in any other State to detect any infestation and to conduct such control measures, including the establishment of cotton-free areas, in cooperation with the State of Texas or other States concerned, as may be necessary to stamp out such infestation, to establish in cooperation with the States concerned a zone or zones free from cotton culture on or near the border of any State or States adjacent to Mexico, and to cooperate with the Mexican Government or local Mexican authorities, or otherwise, by undertaking in Mexico such measures for the extermination of the pink bollworm of cotton as shall be determined to be practicable from surveys showing its distribution, $400,000.

The bulk of the appropriation falls under the fourth item and is essentially an insurance fund to cover such clean-up work in relation to the crop of 1918 as was conducted in the infested cotton areas of Texas with relation to the crop of 1917. It also includes the Federal cooperation with respect to quarantined areas and border cotton-free zones in Texas and other States adjacent to Mexico, and similar cooperative work with Mexico.

COTTON IMPORTATIONS.

The restrictions placed on the entry of foreign raw cotton are to prevent the entry of the pink bollworm and other dangerous cotton insect pests with the seed that is contained in greater or less amount in all such cotton.

The rules and regulations governing the importation of cotton into the United States were revised, effective August 1, 1917, the revision incorporating the amendments that had been promulgated since the issuance of the regulations as revised January 25, 1916, and several other changes. For the convenience of permittees and licensees a compilation and revision was also made of the numerous circular letters of instruction and explanation issued by the board since the promulgation of the original cotton regulations. This compilation was issued in pamphlet form in April, 1918.

The revised regulations leave it optional with the board whether the screening of mills in which disinfected foreign cotton is used, or of warehouses in which such cotton is stored, shall be required. The method of disinfection now in force at northern ports is believed to be normally thoroughly effective. The board has, therefore, removed the screening requirements for all northern mills and warehouses. In the case of cotton mills located in or near the cotton belt, the screening of all storage houses and other places in which foreign cotton is kept, and of rooms in which it is handled and cleaned prior to the carding process, will be continued, as an additional safeguard.

Early in the calendar year 1918 two vacuum fumigation plants were established at Seattle, Wash. Cotton and such cotton waste and burlap as require disinfection may, therefore, now be entered at the ports of Boston, New York, Newark, San Francisco, and Seattle, at all of which ports facilities are available for the

disinfection of the above-mentioned material. Card strips and other grades of cotton waste resulting from and subsequent to the carding machine, if covered with wrappings which conform to the requirements of the cotton regulations, and bagging which has never been used to cover cotton, or American cotton bagging, commonly known as coarse gunny, which has been used to cover only cotton grown in the United States, may be admitted without disinfection at any port at which the board maintains inspection service, including, in addition to the ports mentioned above, Philadelphia and New Orleans.

In the latter part of the fiscal year 1917 the inspector of the board at San Francisco discovered that articles from Japan packed with a low grade of cotton waste containing seeds were being imported through that port. Investigations by inspectors at other ports developed the fact that Japanese and Chinese bric-a-brac, chinaware, crockery, etc., were frequently packed with cotton or cotton waste. The Secretary of State was requested to warn Japanese and Chinese exporters, through the Consular Service, to use packing other than cotton or cotton waste for goods intended for the United States. The board also secured the names of the American importers of such merchandise in this country, and these were requested to instruct their foreign exporters to discontinue the use of such packing for goods consigned to this country. Arrangements have been made with the Treasury Department for the notification of the board by collectors of customs upon the entry from any country of any articles for which cotton waste is used as packing.

All permits for the importation of cotton and all licenses authorizing the use of cotton, issued since July 1, 1916, are valid until revoked. In addition to the permits and licenses issued during the fiscal year ending June 30, 1917, which are still effective, 501 new cotton permits and 119 new cotton licenses were issued by the board during the past fiscal year.

The following table indicates the number of bales of cotton, cotton waste, and burlap imported during the fiscal year, showing country of origin and port of entry:

Cotton, cotton waste, and burlap imported from July 1, 1917, to June 30, 1918, in running bales, showing country of origin and port of entry.

Country of origin.	New York.			Boston.			Philadelphia.			San Francisco.		
	Raw cotton.	Cotton waste.	Burlap.	Raw cotton.	Cotton waste.	Burlap.	Raw cotton.	Cotton waste.	Burlap.	Raw cotton.	Cotton waste.	Burlap.
Brazil	1,125											
Canada					1,150	960						
China	10,202	131		1,181	2					27,688	27	
Colombia	314											
Denmark		201	594									
Dominican Republic	181											
Ecuador	585											
Egypt	500			64,932								
England		141	7,310		321	11,458		479	7,484			
France		644	12,340			1,098						
Haiti	5,658			62								
Holland			259									
India	3,495			2,081						1,918		
Italy		408										
Japan		4,635	133		296						178	720
Mexico		435										

Cotton, cotton waste, and burlap imported from July 1, 1917, to June 30, 1918, in running bales, showing country of origin and port of entry—Continued.

Country of origin.	New York.			Boston.			Philadelphia.			San Francisco.		
	Raw cotton.	Cotton waste.	Burlap.	Raw cotton.	Cotton waste.	Burlap.	Raw cotton.	Cotton waste.	Burlap.	Raw cotton	Cotton waste.	Burlap.
Nicaragua	124											
Panama			12									
Peru	31,627			100								
Portugal			153									
Salvador	7									6		
Scotland			385			197			378			
Spain			1,001									
United States	31			90								
Venezuela		30										
Total	53,849	6,625	22,187	68,446	1,769	13,713		479	7,862	29,612	205	720

Country of origin.	Seattle.			All other ports.			Total.		
	Raw cotton.	Cotton waste.	Burlap.	Raw cotton.	Cotton waste.	Burlap.	Raw cotton.	Cotton waste.	Burlap.
Brazil							1,125		
Canada					7	100		1,157	1,060
China	6,071	43		2			45,144	203	
Colombia							314		
Denmark								201	594
Dominican Republic							181		
Ecuador							585		
Egypt				750			66,182		
England								941	26,252
France								644	13,438
Haiti							5,720		
Holland									259
India	1,000						8,494		
Italy								408	
Japan		328						5,437	853
Mexico				[1]35,986			35,986	435	
Nicaragua							124		
Panama									12
Peru							31,727		
Portugal									153
Salvador							13		
Scotland									960
Spain									1,001
United States		6		7			128	6	
Venezuela								30	
Total	7,071	377		36,745	7	100	195,723	9,462	44,582

[1] Entered at port of Calexico.

In addition to the cotton shown in the table, 196 packages of samples of cotton and cotton waste were imported during the fiscal year.

While a comparison of the above table with the importations shown on the board's report for the fiscal year 1916–17 indicates a considerable falling off of importations of Egyptian cotton, due no doubt largely to the shortage of available tonnage, it shows also a marked increase in importations from practically all other countries shipping cotton to the United States.

NURSERY STOCK IMPORTATIONS.

PROPOSED ADDITIONAL RESTRICTIONS.

The need of additional restrictions or prohibitions, particularly with respect to the entry of certain classes of nursery stock and other plants and seeds on account of exceptional risks involved, has been

under consideration by the Federal Horticultural Board for some time. This consideration has had relation particularly to (1) plants imported with earth about the roots or "balled" plants and (2) plants and seeds of all kinds for propagation from little-known or little-explored countries. The large risk from importations of these two classes of plants comes from the impossibility of properly inspecting plants with earth or of disinfecting the attached earth; and from the dangers which can not be foreseen with respect to plants coming from regions where plant enemies—insect and disease—have been studied very meagerly or not at all. Inspection of such material is necessarily in the blind, and the discovery of infesting insects, particularly if hidden in bark or wood, or of evidence of disease, is largely a matter of chance. The inspection and disinfection of both of these classes of plants as a condition of entry, therefore, is a very imperfect safeguard.

There has further developed throughout the country a wide interest in this subject, which has manifested itself in numerous requests for greater restriction on plant imports from official bodies representing the State departments of agriculture, the inspection officials of the States, entomological and phytopathological associations, forestry associations, etc.

As a basis for such needed additional quarantine restrictions a public hearing was conducted at this department May 28, 1918, at which the whole subject was fully discussed with all of the interests concerned, including, in addition to those enumerated, both the importing nurserymen and seedsmen, as well as the producing nurserymen of the United States.

There have been no changes in the list of foreign countries providing for inspection of nursery stock during the past fiscal year. A full list of such countries was contained in the report for 1917.

COUNTRY OF ORIGIN AND NATURE OF NURSERY-STOCK IMPORTATIONS.

The following table gives the country of origin and the classes of plants and seeds imported during the year ending June 30, 1918.

Country of origin and nature of nursery-stock importations.

Country of origin.	Fruit trees.	Fruit-tree stocks.	Grape-vines.	Bush fruits.	Roses.	Rose stocks.	Forest and ornamental deciduous trees.	Ornamental deciduous shrubs.
Australia				400				
Canada					400			65,905
Cuba							45	
England	4,117		186	35	88,626	1,637,900	8,685	23,325
France	3,444,697	6,310,750		500	165,014	1,344,067	858,829	1,560,221
Holland	6,482		555		736,185	226,527	49,873	357,290
Ireland					62,595	206,524		
Japan	60,187					100,010	62,680	25,294
Philippine Islands							6	
Scotland	282		86		3,683	78,000		148
Total	3,515,765	6,310,750	827	935	1,056,503	3,593,028	980,118	2,032,183

Country of origin and nature of nursery-stock importations.—Continued.

Country of origin.	Coniferous trees other than pines.	Pines.	Evergreen trees.	Evergreen shrubs.	Field-grown florists' stock.	Stocks, cuttings, or seedlings.	Tree seeds, pounds.
Australia							7,188
Bermuda	250		8,957		16,275		1,277
Brazil					11,601		35,214
Canada	4		1	100	1,258	25,700	
Canal Zone					600		
Colombia					27,623		
Costa Rica					298		
Cuba			160	13	1,093		
Dutch Guiana					25		
England	7,392		2,647	68,999	23,627		
France	239,766		34,739	139,212	126,660	2,543,218	
Guatemala					100		
Holland	43,640		3,353	187,117	365,139	40,723	
India					25		
Italy							3
Japan	7,233	1,958	387	3,213	12,275	54,227	8,291
Leeward Island (Antigua)							29
New South Wales							23,500
New Zealand					3	84	
Panama					400		
Philippine Islands					1,720		7
Salvador				200			
Samoa					14		
Scotland	121		14	300	191		
Spanish Honduras					28		
Trinidad					6,997		781
Venezuela					17,600		
Total	298,406	1,958	50,258	399,154	613,552	2,663,952	76,290

DISTRIBUTION OF IMPORTED NURSERY STOCK, BY STATES.

The following table indicates the distribution by States of nursery stock imported during the past five years:

Distribution of imported nursery stock, by States.

State.	Number of cases.				
	1917–18	1916–17	1915–16	1914–15	1913–14
Alabama	69	173	284	241	125
Arizona					4
Arkansas	2	26	22	95	11
California	995	4,891	2,403	3,357	1,929
Colorado	11	162	152	150	152
Connecticut	413	801	1,972	1,372	1,432
Delaware	1	54	53	40	38
District of Columbia	44	422	491	549	562
Florida	19	200	1,466	2,461	56
Georgia	96	223	191	228	196
Hawaii	10	79	57	20	4
Idaho		6	4	5	9
Illinois	473	2,891	4,671	3,316	3,942
Indiana	89	464	577	569	545
Iowa	398	731	905	1,066	394
Kansas (north)	15	105	55	51	48
Kansas (south)	133	96	292	292	286
Kentucky	77	188	410	320	352
Louisiana	89	228	279	400	416
Maine		53	65	42	51
Maryland	154	308	595	756	553
Massachusetts	662	2,112	4,769	4,221	5,115
Michigan	323	910	1,325	1,562	1,232
Minnesota	91	300	746	701	528
Mississippi	17	40	21	23	35
Missouri	68	380	513	592	676
Montana		36	32	20	26
Nebraska	61	151	249	217	149
Nevada				1	2

Distribution of imported nursery stock, by States—Continued.

State.	Number of cases.				
	1917–18	1916–17	1915–16	1914–15	1913–14
New Hampshire	2	40	44	53	57
New Jersey	2,369	6,860	13,295	8,829	10,458
New Mexico	.....	.....	.....	.....	1
New York	3,937	8,058	16,325	12,669	12,363
North Carolina	23	70	121	80	162
North Dakota	1	20	56	12	8
Ohio	1,127	2,447	3,314	3,374	3,068
Oklahoma	3	14	17	15	13
Oregon	44	326	355	480	560
Pennsylvania	1,282	3,638	6,096	6,556	9,309
Rhode Island	33	212	562	741	606
South Carolina	6	25	41	39	41
South Dakota	7	19	29	16	16
Tennessee	70	161	185	197	200
Texas	110	183	151	139	184
Utah	.....	19	25	27	35
Vermont	1	17	41	24	20
Virginia	18	273	379	354	338
Washington	74	388	421	403	482
West Virginia	.....	129	87	87	102
Wisconsin	78	429	509	430	334
Total	13,495	39,358	64,652	57,192	57,225

STATE AND FEDERAL INSPECTION OF IMPORTED PLANTS AND PLANT PRODUCTS.

As the result of State and Federal inspection of imported nursery stock and other imported plants and plant products during the fiscal year, some 280 different species of insects were intercepted, including seven nests of the brown-tail moth and three egg masses of the gipsy moth from France; six pupæ of the sorrel cutworm on miscellaneous stock from France, and one on azaleas from Belgium; larvæ of the gold-tail moth on rhododendrons, laburnums, roses, and Japanese maples from Holland and on *Cerasus avium* from France; the lesser bulb fly in bulbs from Holland, nests of the fruit-tree pierid in six shipments of deciduous fruit-tree seedlings from France, numerous scale insects and ants from various quarters of the globe. One shipment of cotton seed, infested with the pink bollworm, from Natal do Norte, Brazil, arrived at New York in violation of Quarantine Notice No. 8, and, as a result, was returned to the port of origin.

During the same period, 218 plant diseases were intercepted and identified on imported material. These organisms occurred on 115 different host plants. Three attempts were made to import, respectively, grapefruit, mandarin orange, and round orange, found to be affected with citrus canker. All were from the vicinity of Canton, China. With respect to the assurance by nurserymen that apple stocks from France are very free from crown gall, it is interesting to note that every tree of a shipment of 1,009 apple stocks received by the United States Department of Agriculture from France was rejected because it was affected with a hairy root form of crown gall.

INSPECTION AT PLANT INTRODUCTION GARDENS.

A very important part of the Federal inspection work has relation to the plant introduction gardens maintained by the Department of Agriculture at Yarrow, Md., Miami and Brownsville, Fla., and Chico,

Cal. All plant material shipped from these stations was examined during the year or at the time of shipment to eliminate the possibility of dissemination of noxious insects or plant diseases.

PLANT QUARANTINES.

The foreign and domestic quarantines and other restrictive orders now being enforced under the plant quarantine act are listed at the end of this report. Of these the following have been promulgated or revised during the year:

Domestic.—The sweet potato and yam quarantine, the banana plant quarantine, and the gipsy moth and brown-tail moth quarantine (a revision).

Foreign.—The sweet potato and yam quarantine, and the banana plant quarantine.

The sweet potato and yam quarantine prohibits the further entry of sweet potatoes and yams from all foreign countries and from the Territories of Hawaii and Porto Rico, effective January 1, 1918. Promulgation of this quarantine was based on the risk which developed of entry of a new and important sweet potato pest, the so-called sweet potato scarabee (*Euscepes batatae*), which has a fairly wide distribution in the West Indian Islands and in South America and also in certain trans-Pacific islands and countries. The quarantine is also aimed at the sweet potato weevils, one of which has already got firm foothold in this country and is now being made the subject of an effort at extermination. The only means of excluding these insects is to prohibit the entry of sweet potatoes and yams, inasmuch as the larvæ of these insects may be entirely hidden within the tubers and beyond the reach of disinfectants. The total importations of sweet potatoes and yams affected by this quarantine is inconsiderable.

The quarantine prohibiting the entry of banana plants from foreign countries and from the Territories of Hawaii and Porto Rico, effective April 1, 1918, is directed particularly at the banana root borer (*Cosmopolites sordidus* Germar), known to have a fairly wide distribution throughout the tropical regions of both hemispheres. This borer may be readily transported in shipments of banana plants and has been the cause of extensive loss to plantations in countries where it is established. This insect was discovered in Florida this year, evidently a recent importation affecting comparatively few plantations. Radical measures were undertaken by the State in cooperation with this department to effect its extermination, so that the banana industry which may hereafter develop in Florida or elsewhere may be safeguarded from this source of loss. No important commercial interests are affected by this quarantine.

The gipsy moth and the brown-tail moth quarantine, effective June 1, 1918, represents merely the annual revision of this quarantine which has been in effect since November 25, 1912, to take account of necessary changes in distribution. The changes necessary this year were comparatively unimportant.

COOPERATIVE WORK.

The board has cooperated during the year in the inspection and clean-up work with relation to the newly imported banana weevil in

Florida, the Japanese beetle in New Jersey, the European corn borer in Massachusetts, the oriental peach moth in eastern United States, and in the campaign to secure the eradication of the common barberry throughout the upper Mississippi Valley.

The board has further cooperated with the Bureau of Entomology in the enforcement of the moth quarantine affecting portions of the New England States, and in the Mediterranean fruit fly and melon fly quarantine in Hawaii. In respect to these two quarantines the board has supervision of the enforcement of the quarantines, which are supported, however, by special appropriations assigned to the Bureau of Entomology.

TERMINAL INSPECTION OF INTERSTATE MAIL SHIPMENTS OF PLANTS AND PLANT PRODUCTS.

During the year the State of Washington availed itself of the provisions of the act of March 4, 1915, by providing for terminal inspection of mail shipments of plants and plant products originating in other States. California, the first State to make provision for such inspection in 1915, was followed in 1916 by Arizona and Montana, and in 1917 by Florida. All plants and plant products shipped to these five States under the certification of the Federal Horticultural Board are exempted from such inspection.

VIOLATIONS OF THE PLANT QUARANTINE ACT.

During the year the Solicitor reported to this office the conviction of two shippers and two common carriers for the shipment, interstate, without inspection and certification, of plants and plant products from the area quarantined on account of the gipsy moth and the brown-tail moth to points outside of that area. Fines aggregating $95 were imposed.

POTATO WART IN THE UNITED STATES.

In September of this year, subsequent to the period covered in this report but prior to its publication, several well-established cases of the wart disease of the potato were discovered in gardens in 26 small mining towns in Luzerne, Schuylkill, and Carbon Counties in eastern Pennsylvania. The full extent of the infestation has not yet been determined, but an active survey of this and other districts is now under way in cooperation with the authorities of the State of Pennsylvania. In most of these gardens it has been observed by the owners during the last two seasons. In many gardens it has been severe for three years, while in a few instances it has done considerable damage for four years.

The source of the disease appears to be a shipment of several carloads of European potatoes of inferior quality, distributed in 1912, before the passage of the plant quarantine act of August 20 of that year. This act specifically provided for an immediate quarantine against countries infested with the potato wart, and subsequent to the passage of this act, no importations of potatoes have been made from countries where potato wart is known to exist.

The infested area is more or less isolated, and the growth of potatoes is in gardens for local use. There is no commercial growth of potatoes in the district and therefore little likelihood of any commercial or other shipments of potatoes out of the district.

Under the leadership of Economic Zoologist J. G. Sanders the Pennsylvania State authorities are taking necessary restrictive measures to prevent infected material from moving out of the district.

It is rather to be feared that other shipments of European potatoes, made prior to the quarantine, have carried the disease to other districts, and a counttry-wide examination of gardens of industrial and mining villages, which were the principal markets for cheap foreign potatoes, is being made. This disease has certainly not developed in any of the important potato-producing sections of this countrty.

LIST OF CURRENT QUARANTINE AND OTHER RESTRICTIVE ORDERS.

QUARANTINE ORDERS.

The numbers assigned to these quarantines indicate merely the chronological order of issuance of both domestic and foreign quarantines in one numerical series. The quarantine numbers missing in this list are quarantines which have either been superseded or revoked. For convenience of reference these quarantines are here classified as domestic and foreign.

DOMESTIC QUARANTINES.

Date palms.—Quarantine No. 6: Regulates the interstate movement of date palms or date-palm offshoots from Riverside County, Cal., east of the San Bernardino meridian; Imperial County, Cal., Yuma, Maricopa, and Pinal Counties, Ariz., and Webb County, Tex.; on account of the Parlartoria scale (*Parlatoria blanchardi*) and the Phoenicococcus scale (*Phoenicococcus marlatti*).

Cotton seed and cottonseed hulls.—Quarantine No. 9: Prohibits the importation of cotton seed and cottonseed hulls from the Territory of Hawaii on account of the pink bollworm.

Hawaiian fruits.—Quarantine No. 13, revised: Prohibits or regulates the importation from Hawaii of all fruits and vegetables, in the natural or raw state, on account of the Mediterranean fruit fly and the melon fly.

Sugar cane.—Quarantine No. 16: Prohibits the importation from Hawaii and Porto Rico of living canes of sugar cane or cutting or parts thereof, on account of certain injurious insects and fungus diseases.

Cotton.—Quarantine No. 23, revised: Regulates the movement of cotton from Hawaii to the continental United States, on account of the pink bollworm.

Gipsy moth and brown-tail moth.—Quarantine No. 27: Regulates the movement interstate to any point outside of the quarantined towns and territory, or from points in the generally infested area to points in the lightly infested area, of stone or quarry products, and of the plants and plant products listed therein. This quarantine covers portions of the New England States.

Five-leafed pines, Ribes, and Grossularia.—Quarantine No. 26: Prohibits the interstate movement of five-leafed pines, currant and gooseberry plants from all States east of and including the States of Minnesota, Iowa, Missouri, Arkansas, and Louisiana to points outside of this area; prohibits further, the interstate movement of five-leafed pines and black-currant plants to points outside the area comprising the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, and New York on account of the white-pine blister rust.

Sweet potato and yam.—Quarantine No. 30: Prohibits the movement from the Territories of Hawaii and Porto Rico into or through any other Territory, State, or District of the United States of all varieties of sweet potatoes and yams (*Ipomoca batatas* and *Dioscorea* spp.) regardless of the use for which the same are intended, on account of the sweet-potato weevil (*Cylas formicarius*) and the sweet-potato scarabee (*Euscepes batatae*).

Banana plants.—Quarantine No. 32: Prohibits the movement from the Territories of Hawaii and Porto Rico into or through any other Territory, State, or District of the United States of any species or variety of banana plants (*Musa* spp.), regardless of the use for which the same are intended, on account of two injurious weevils, *Rhabdocnemis obscurus* and *Metamasius hemipterus*.

FOREIGN QUARANTINES.

Irish potato.—Quarantine No. 3: Prohibits the importation of the common or Irish potato from Newfoundland; the islands of St. Pierre and Miquelon; Great Britain, including England, Scotland, Wales, and Ireland; Germany; and Austria-Hungary, on account of the disease known as potato wart.

Mexican fruits.—Quarantine No. 5, as amended: Prohibits the importation of oranges, sweet limes, grapefruit, mangoes, achras sapotes, peaches, guavas, and plums from the Republic of Mexico, on account of the Mexican fruit fly.

Five-leafed pines, Ribes, and Grossularia.—Quarantine No. 7, as amended: Prohibits the importation from each and every country of Europe and Asia, and from the Dominion of Canada and Newfoundland, of all five-leafed pines and all species and varieties of the genera *Ribes* and *Grossularia*, on account of the white-pine blister rust.

Cotton seed and cottonseed hulls.—Quarantine No. 8, as amended: Prohibits the importation from any foreign locality and country, excepting only the locality of the Imperial Valley, in the State of Lower California, Mexico, of cotton seed (including seed cotton) of all species and varieties, and cottonseed hulls, on account of the pink bollworm. Cotton and cotton seed from the Imperial Valley may be entered under permit and regulation.

Seeds of avocado or alligator pear.—Quarantine No. 12; Prohibits the importation from Mexico and the countries of Central America of the seeds of the avocado or alligator pear, on account of the avocado weevil.

Sugar cane.—Quarantine No. 15: Prohibits the importation from all foreign countries of living canes of sugar cane or cuttings or parts thereof, on account of certain injurious insects and fungus diseases. There are no restrictions on the entry of such materials into Hawaii and Porto Rico.

Citrus nursery stock.—Quarantine No. 19: Prohibits the importation from all foreign localities and countries of all citrus nursery stock, including buds, scions, and seeds, on account of the citrus canker and other dangerous citrus diseases. The term "citrus," as used in this quarantine, includes all plants belonging to the subfamily or tribe *Citratæ*.

European pines.—Quarantine No. 20: Prohibits, on account of the European pine-shoot moth (*Evetria buoliana*), the importation from all European countries and localities of all pines not already excluded by Quarantine No. 7.

Indian corn or maize and related plants.—Quarantine No. 24, as amended: Prohibits the importation from southeastern Asia (including India, Siam, Indo-China, and China), Malayan Archipelago, Australia, New Zealand, Oceania, Philippine Islands, Formosa, Japan, and adjacent islands, in the raw or unmanufactured state, of seed and all other portions of Indian corn or maize (*Zea mays* L.), and the closely related plants, including all species of Teosinte (*Euchlaena*), Job's tears (*Croix*), *Polytoca*, *Chionachne*, and *Sclerachne*, on account of the downy mildews and *Physoderma* diseases of Indian corn, except that Indian corn or maize may be imported on compliance with the conditions prescribed in the regulations of the Secretary of Agriculture.

Citrus fruit.—Quarantine No. 28: Prohibits the importation from eastern and southeastern Asia (including India, Siam, Indo-China, and China), the Malayan Archipelago, the Philippine Islands, Oceania (except Australia, Tasmania, and New Zealand), Japan (including Formosa and other islands adjacent to Japan), and the Union of South Africa, of all species and varieties of citrus fruits, on account of citrus canker, except that oranges of the mandarin class (including satsuma and tangerine varieties) may be imported on compliance with the conditions prescribed in the regulations of the Secretary of Agriculture.

Sweet-potato and yam.—Quarantine No. 29: Prohibits the importation for any purpose of any variety of sweet potatoes or yams (*Ipomœa batatas* and *Dioscorea* spp.) from all foreign countries and localities, on account of the sweet-potato weevils (*Cylas* spp.) and the sweet-potato scarabee (*Euscepes batatæ*).

Banana plants.—Quarantine No. 31: Prohibits the importation for any purpose of any species or variety of banana plants (*Musa* spp.), from all foreign countries and localities, on account of the banana root borer (*Cosmopolites sordidus*).

OTHER RESTRICTIVE ORDERS.

The regulation of the entry of nursery stock from foreign countries into the United States was specifically provided for in the plant-quarantine act. The act further provides for the similar regulation of any other class of plants or plant products when the need therefor shall be determined. The entry of the plants and plant products listed below has been brought under such regulation:

Nursery stock.—Nursery stock is entered under regulations requiring a permit, foreign certification and marking, reporting arrival and distribution, and inspection at destination. The term "nursery stock" includes all field-grown

florists' stock, trees, shrubs, vines, cuttings, grafts, scions, buds, fruit pits and other seeds of fruit and ornamental trees or shrubs, and other plants and plant products for propagation, except field, vegetable, and flower seeds, bedding plants, and other herbaceous plants, bulbs, and roots.

Irish potatoes.—The importation of Irish potatoes is prohibited altogether from the countries enumerated in the potato quarantine. Potatoes may be admitted from other foreign countries in accordance with the order of December 22, 1913, bringing the entry of potatoes under restriction on account of injurious potato diseases and insect pests. The following countries have qualified for the importation of potatoes under the regulations issued under said order: Denmark, Holland, Belgium, Cuba, Bermuda, and the Dominion of Canada. The regulations issued under this order have been amended so as to permit, free of any restrictions whatsoever under the plant quarantine act, the importation of potatoes from any foreign country into the Territories of Porto Rico and Hawaii for local use only and from the Dominion of Canada and Bermuda into the United States or any of its Territories or Districts.

Avocado, or alligator pear.—The order of February 27, 1914, prohibits the importation from Mexico and the countries of Central America of the fruits of the avocado, or alligator pear, except under permit and in accordance with the other provisions of the regulations issued under said order on account of the avocado weevil. Entry is permitted only through the port of New York and is limited to the large, thick-skinned variety of the avocado. The importation of the small, purple, thin-skinned variety of the fruit of the avocado and of avocado nursery stock under 18 months of age is prohibited.

Cotton.—The order of April 27, 1915, prohibits the importation of cotton from all foreign countries and localities, except under permit and in accordance with the other provisions of the regulations issued under said order, on account of injurious insects, including the pink bollworm. These regulations apply in part to cotton grown in and imported from the Imperial Valley, in the State of Lower California, in Mexico.

Corn.—The order of March 1, 1917 (Amendment No. 1, with Regulations, to Notice of Quarantine No. 24), prohibits the importation of Indian corn or maize in the raw or unmanufactured state from the countries and localities listed in Notice of Quarantine No. 24, except under permit and in accordance with the other provisions of the regulations issued under said order, on account of injurious diseases of Indian corn.

Cottonseed products.—The order of June 23, 1917, prohibits the importation of cottonseed cake, meal, and all other cottonseed products, except oil, from all foreign countries, and a second order of June 23, 1917, prohibits the importation of cottonseed oil from Mexico except under permit and in accordance with the other provisions of the regulations issued under said orders, on account of injurous insects, including the pink bollworm.

Citrus fruits.—The order of June 27, 1917 (Notice of Quarantine No. 28, with Regulations), prohibits the importation from the countries and localities listed therein of all species and varieties of citrus fruits, excepting only oranges of the mandarin class (including satsuma and tangerine varieties), on account of the citrus-canker disease. Oranges of the mandarin class (including satsuma and tangerine varieties) may be imported under permit and in accordance with the other provisions of the regulations issued under said order.

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